



# Basalt Fiber Reinforced Polymer “BFRP” in Manhole Rehabilitation

*Fred Tingberg Jr., Basanite Industries*

*Jason Zapatocki, Basanite Industries*

*Ben Safren, Building Envelope Associates*



*Basanite Industries, LLC is a wholly owned subsidiary  
Of Basanite, Inc.; a publicly traded company : OTCQB-BASA*



## SANITARY SEWER MANHOLES REPRESENT THE MOST CHALLENGING ENVIRONMENTS IN ALL CONCRETE REINFORCED APPLICATIONS

- Salt Exposure both internally and Soil Side
- Rising Tides increasing hydrostatic pressures
- Effluent Chemical attack by Domestic Sewerage, Industrial Chemicals and constituent elements not always predictable
- Acid Concentrations rising as infrastructure rehabilitation ensues
- Sulfide Gas Attack of porous Concrete substrate









Steel Reinforcement Protection Methods in Sanitary Manholes include:

These **minimize** the impact of salt water/corrosive effluent exposure

- Coated Rebar
- Higher Grade Steels such as Galvanized or Stainless
- Encapsulating Reinforcement with Barrier Coatings or Linings

**OR (BFRP)**

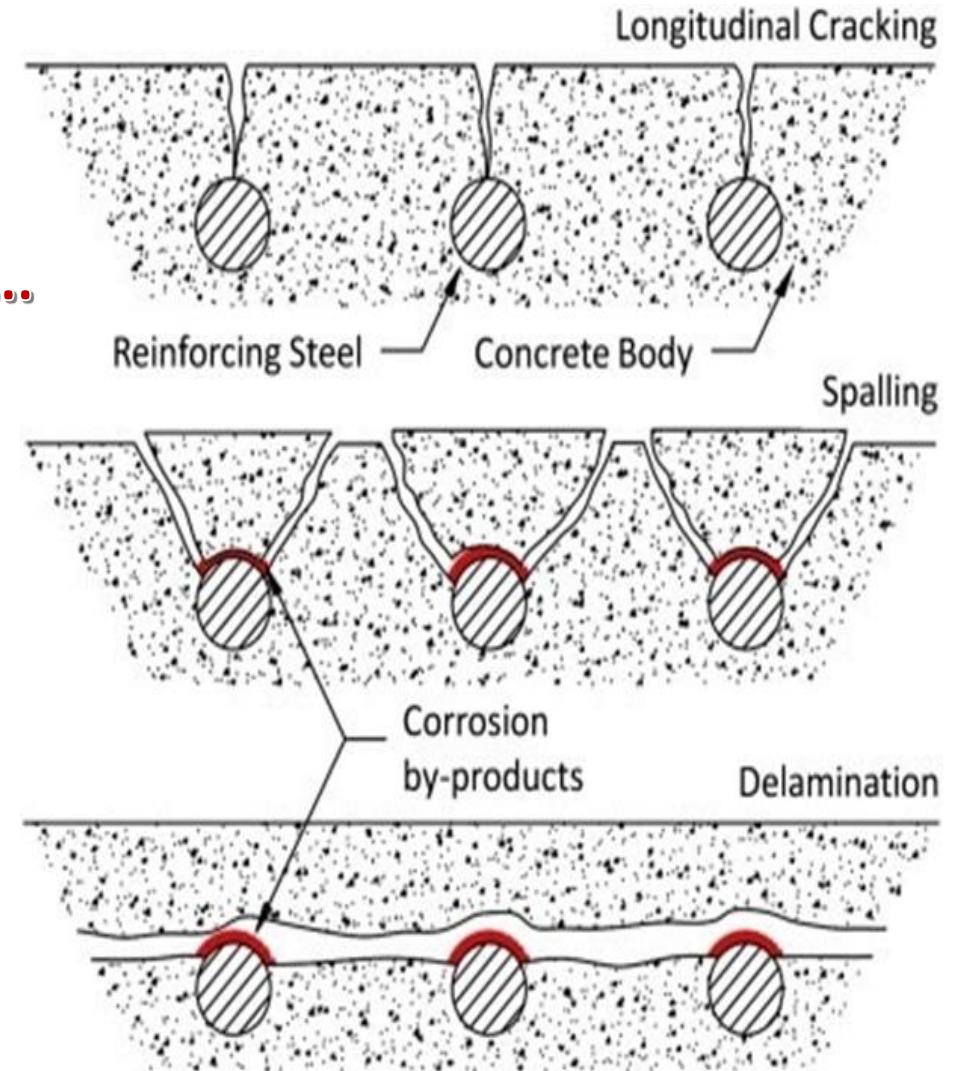
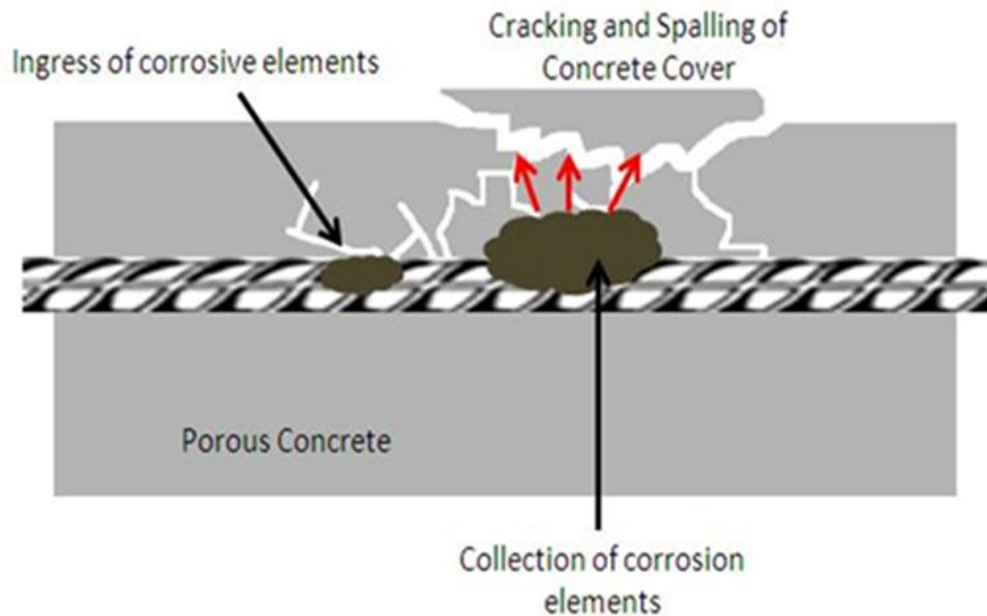
This disallows any impact of salt water/corrosive effluent exposure

**INERT “Non-Ferrous”, FRP STRUCURAL REINFORCEMENT**

# The Problem with Carbon Steel reinforcements

- Failing Infrastructure Due to Corrosion
- Extremely High Cost of Repair / Replacement
- Shortened Concrete Life Cycles
- Serious Safety Concerns

This happens to ALL steel rebar & mesh...

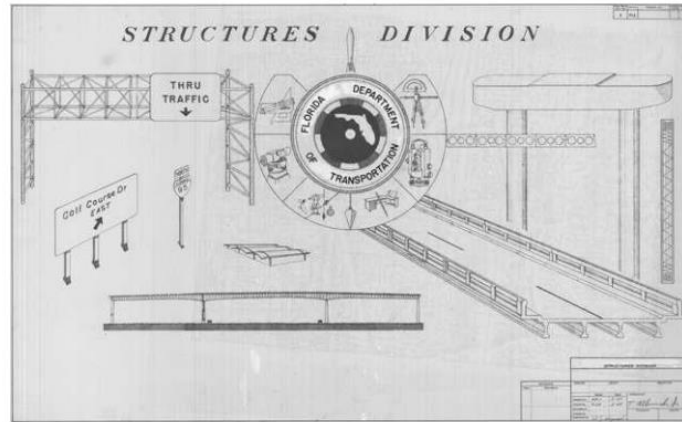




# How these problems manifest themselves:







## FIBER REINFORCED POLYMER GUIDELINES (FRPG)

STRUCTURES MANUAL  
VOLUME 4  
JANUARY 2022



## 2 BASALT AND GLASS FIBER REINFORCED POLYMER (BFRP, GFRP) AND CARBON FIBER REINFORCED POLYMER (CFRP) REINFORCING BARS

### 2.1 PERMITTED USE

- A. BFRP, GFRP and/or CFRP reinforcing bars may be used in the following concrete components:
- Approach Slabs
  - Bridge Decks and Bridge Deck overlays
  - Cast-in-Place Flat Slab Superstructures
  - Pile Bent Caps (Only specify GFRP and/or CFRP for submerged locations)
  - Pier Columns and Caps (Only specify GFRP and/or CFRP for submerged locations)
  - Retaining Walls, Noise Walls, Perimeter Walls
  - Pedestrian/Bicycle Railings
  - Bulkheads and Bulkhead Copings with or without Traffic or Pedestrian/Bicycle Railings
  - MSE Wall Panels and Copings
  - Drainage Structures
  - Dowel bars for expansion joints in junction slabs when paired with a keyed joint.
- B. Other components that may be considered but require SSDE approval before use, include:
- Pier Columns and Footings in direct contact with water using BFRP reinforcing bars
  - Traffic Railings
  - Bulkhead Copings with Traffic Railings

# UAZ Community Development Project

March 14, 2022

Mr. Michael Haggerty, P.E.  
BCWWS  
2555 West Copans Road  
Pompano Beach, Florida 33069

**RE: UAZ 123, BCWWS PROJECT NO. 100978  
BASALT FIBER REINFORCEMENT  
CTA PROJECT NO. 15-0038-123-01**

Dear Mike,

In a follow up to the Technical Standards Committee Meeting last week, it appears based on the information provided by Giannetti, approval from the City of Pompano Beach for similar installation and FDOT acceptance of the use of basalt fiber reinforcement polymers (BFRP) in concrete structures, Craven Thompson & Associates has no issue with allowing the use of BFRP reinforcement for the remaining sixteen (16) structures in UAZ 123. All material and work shall conform to FDOT, ACI and AASHTO requirements for the use of BFRP in concrete structures.

Should you need any additional information regarding this matter please do not hesitate to contact this office.

Sincerely

**Craven Thompson & Associates, Inc.**



PATRICK J. GIBNEY, P.E.

**Craven Thompson**



**& ASSOCIATES INC.**

Engineers  
Planners  
Surveyors  
Landscape Architects



# Basalt Fiber Reinforced Polymer “BFRP”

FDOT Listed, Tested and  
Approved

Strength 2.5 X Greater than  
Steel

25% of the Weight

Inert in Salt Water, Sulfide Gas  
and Acids, Non-Conductor of  
Electricity





Indian Creek Village  
Roadway Improvement Project

North of Miami Beach  
Adjacent to Surfside Florida

Giannetti Contracting, Pompano Bch  
Stantech Engineering, Coral Gables  
Concrete Products of Palm Beach

Structures Required  
Corrosion Concerns  
Salt intrusion into soil envelope  
Island surrounded by Intracoastal  
100-year service life desired





UAZ 123 Community Improvements  
Broward County Utilities

Giannetti Contracting, Pompano Bch  
Craven Thompson Engineers  
Concrete Products of Palm Beach

Neighborhood Improvements  
45 Sanitary Manholes

Exposed to intracoastal waterway  
access Canals  
Sulfide Gas Corrosion Concerns  
100-year service life desired



# Industry Seeking 100 Year Life

**BFRP**

**Sustainable**

**Green**

**Low Carbon Emission**

**Leed Certified**



**Designing For 100 Year Service Life:**  
Integrating Durability and Structural Design



Construction Industry historical requirement 50-year service life vs.  
Sustainable service life greater than 100 years.

Alternatives include **BFRP**, Epoxy Coated Steel Rebar, HDG (galvanized); **Fiber Glass** and **Carbon fiber** rebar...

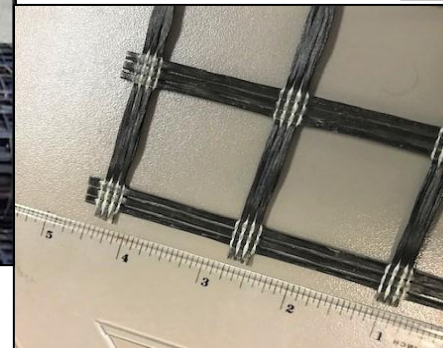
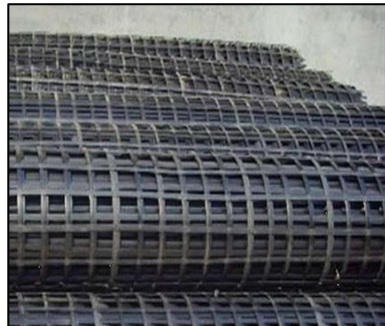
***BASALT “BFRP” IS NOT “Apples to Apples” with Carbon Steel!***



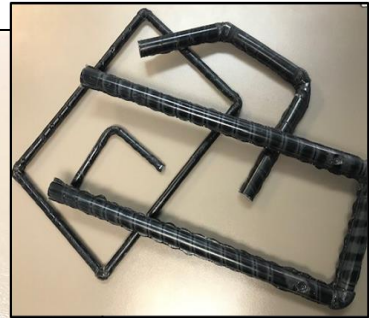
# Products



Rebar, service life > 100 years  
sustainable/rust proof/green  
25% of the weight of steel  
Tensile Strength 2.5 greater  
BFRP Rebar non-conductive,  
resistant to chemicals, UV  
and alkali.



Basalt Multifilament & Macro Fibers non-corrosive, isotropic reinforcement, provide “toughness” through “Fiber-Free Finish”. 100’s of millions of high tenacity fibers that proactively mitigate and control the formation of plastic shrinkage cracking absorb stresses, no volumetric changes in fresh and hardened concrete. Improves toughness & post-crack performance, surface performance Impact, Fatigue and Freeze / Thaw resistance.



Geo-Grid Material from BFRP used in walls, flatwork, stucco lath, thin-wall precast prevents cracks; reinforcement of asphalt, mortars and cementitious applications. Reinforcing applications where coverage depth and shadowing are of concern.



# BFRP Saves Time & Money

## BFRP NEVER Rusts or Corrodes!

- No Spalling or Cracking – Better Surface Performance
- Reduce or Eliminate Ongoing Maintenance & Repairs
  - Significantly Longer Service Life
- Reduced Concrete Cover; No Extra Code Requirements
- Eliminates Need for Sealants, Barriers or Coatings

## BFRP is 75% Lighter than Steel Rebar

- Reduces Transportation Costs 4 : 1
- Smaller equipment, less time to unload
- Easier and Safer to Handle / Place
- Lighter Weight Concrete Elements; Lighter Structures

## BFRP is Resistant to Chemicals, UV & Alkali

- Not effected by chloride additives or contaminants
- Excellent in Freeze / Thaw or other Harsh Environments

## Non-Conductive; No RF Signal Interference







[ft@Basaniteindustries.com](mailto:ft@Basaniteindustries.com)

+01 954 982 0804

<http://Basaniteindustries.com>



*Basanite Industries, LLC is a wholly owned subsidiary  
Of Basanite, Inc.; a publicly traded company: OTCQB-BASA*